

574.0623

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF GONATID SQUID FROM
THE NORTHEASTERN PACIFIC¹

BY WILLIAM G. PEARCY AND GILBERT L. VOSS

*Department of Oceanography, Oregon State University and
The Marine Laboratory, University of Miami*

This paper describes a new species of squid, *Gonatus anonychus*, which was collected in oceanic waters of the northeastern Pacific Ocean off the Oregon coast during 1960-62.

Gonatus anonychus belongs to the family Gonatidae which is composed of two genera, *Gonatus* and *Gonatopsis*. The genus *Gonatus* includes two other species: *G. fabricii* (Lichtenstein, 1818) and *G. magister* Berry, 1913.

The authors are grateful to Bruce Wyatt, Michael Laurs, Ward Renshaw, and to the crew of the R/V *Acona* for making collections at sea, to William Aron and the University of Washington for the loan of the *G. magister*, to Shirley Moorhead for preparing the illustrations, and to James McCauley for comments on the manuscript.

The work of the senior author was supported in part by a grant from the Atomic Energy Commission (AT(45-1)-1726), and that of the junior author by a grant from the National Science Foundation (G-5853), for which they express their appreciation. Ship time was supported by grants from the Office of Naval Research and the National Science Foundation.

***Gonatus anonychus*, new species**

Holotype: Male, in alcohol, mantle length 69.5 mm, from 45°26.8'N, 125°08.1'W, 11 September 1960. USNM 575559.

Paratypes: Two males, mantle length 70.0-73.0 mm, and two females, mantle length 61.0-65.0 mm, deposited at The Marine Laboratory, University of Miami. (Twenty other specimens are located at the Department of Oceanography, Oregon State University.)

¹ Contribution No. 466 from the Institute of Marine Science, University of Miami.

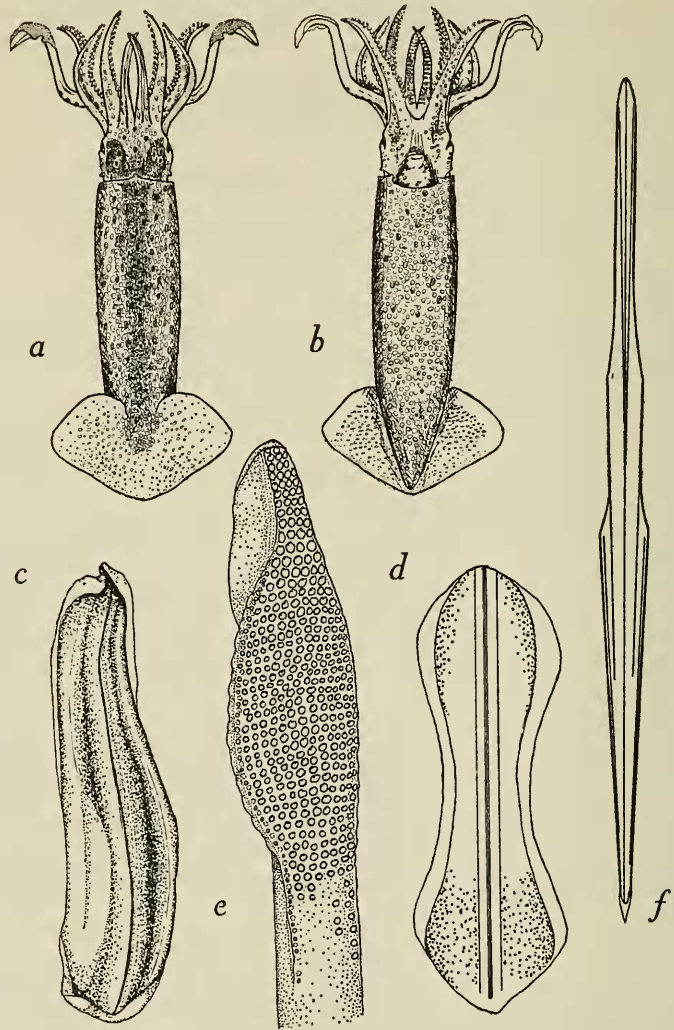


FIG. 1. *Gonatus anonychus*, new species. *a*, Dorsal view. *b*, Ventral view. *c*, Funnel cartilage. *d*, Nuchal cartilage. *e*, Left tentacular club. *f*, Ventral view of gladius.

Description: The mantle (Fig. 1*a,b*) is long, loliginiform, cylindrical for two-thirds its length, from the anterior mantle edge to the insertion of the fins; the posterior one-third of the mantle is conical, ending in a blunt point. The maximum mantle width may occur anywhere in front of the fins and is from one-fourth to one-fifth of the dorsal mantle length. There is a small triangular projection on the anterodorsal midline of the mantle margin and a broad ventral emargination beneath the funnel bordered laterally by acute projections. The mantle wall is thick, measuring 2.5–3.0 mm.

The *fins* are subterminal, their length about one-third of the mantle length. The breadth of the combined fins is about 1.6–1.9 times their length. The anterior margins are convex with anterior lobes; the posterior margins are nearly straight.

The *funnel* extends anteriorly to about the middle of the eye and has rounded margins, a blunt end and a transverse groove on the ventral surface. The funnel organ consists of a dorsal inverted V-shaped member and smaller, slightly angular ventral pads. The funnel-locking apparatus (Fig. 1*c*) consists of a slightly sinuous funnel cartilage which is slightly expanded posteriorly with a broad depression or sulcus on the anterior two-thirds, ending posteriorly as an angular ridge.

The *nuchal cartilage* (Fig. 1*d*) is expanded at both ends, with a median minimum width only about one-fifth of the total length. The longitudinal crest has a median groove along its entire length.

The *head* is short, somewhat compressed, constricted at the neck and not quite as wide as the anterior edge of the mantle. The funnel groove on the ventral surface of the head is well defined and has a number of longitudinal ridges extending anteriorly. There are three nuchal folds on each side of the head, of which the middle one is largest with a small free olfactory lobe. The *eyes* are large, with variable-sized lid openings which have a distinct sinus on the anterior border between the third and fourth arms.

The *arms* are short, the arm order formula usually 2.4.3.1. The first arms are very short and the others are subequal. The first pair possess a low keel along the full length of each arm; the second pair are smooth; the third arms are flattened and equipped aborally with a broad well-developed swimming keel; the ventral pair are flattened with a broad tentacular sheath along the dorsal edge. There is no hectocotylization in the males.

All of the arms possess four rows of suckers. The suckers of the marginal rows are strongly pedicellate and the chitinous rings have generally six flattened, rectangular teeth with blunt tips (Fig. 2*b*); these large teeth are sometimes bordered laterally by one or two small teeth. The suckers of the inner rows are larger, particularly on the middle portion of the arms. The chitinous rings of the suckers from the basal two-thirds to three-fourths of the inner rows are not differentiated into separate narrow teeth, but consist of distal and proximal chitinous lips (Fig. 2*a*). A few (less than six) of the inner suckers in the basal portion of the first three pairs

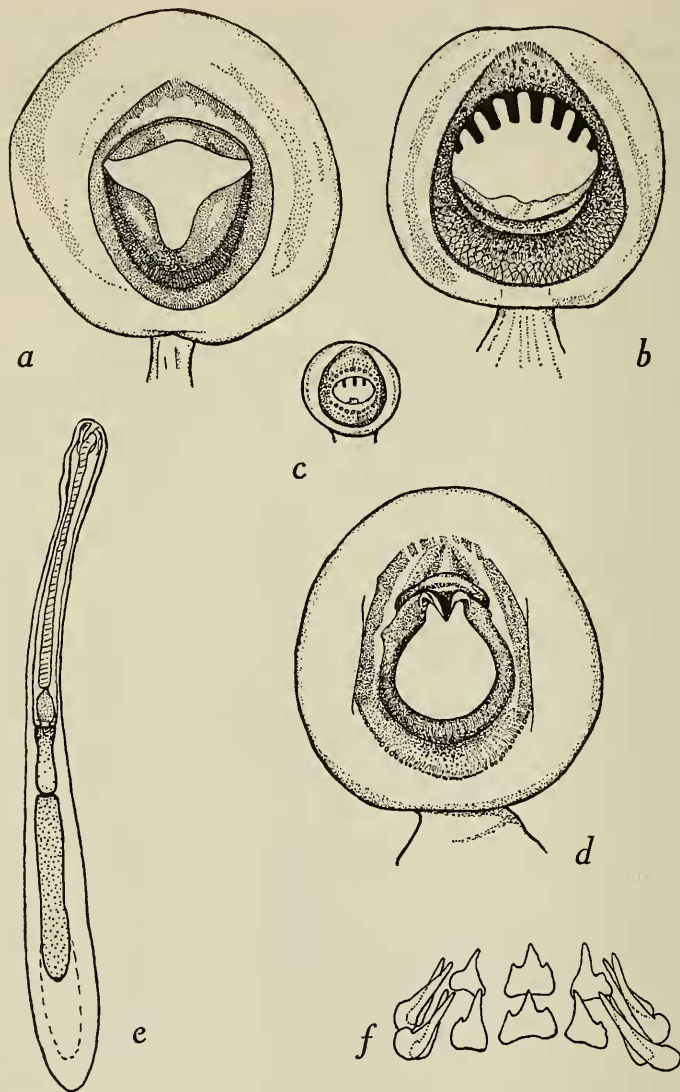


FIG. 2. *Gonatus anonychus*, new species. *a*, Sucker from basal two-thirds of inner rows of third arms. *b*, Sucker from outer row of third arms. *c*, Sucker from tentacular club. *d*, Sucker from inner row of basal portion of third arm of female. *e*, Spermatophore. *f*, Radula.

TABLE 1.—Measurements (in mm) of the holotype and selected paratypes of *Gonatus anonychus*, new species

	HOLOTYPE		PARATYPES		
	♂	♂	♀	♂	♀
Sex	♂	♂	♀	♂	♀
Mantle length	69.5	73.0	65.0	70.0	61.0
Mantle width	18.0	17.1	14.8	15.0	15.0
Head width	15.5	14.7	15.0	16.1	14.0
Fin length	20.7	23.0	21.0	21.0	18.0
Fin width	37.0	39.2	36.0	35.0	31.0
Arms I	20.0	18.0	16.0	20.0	16.0
II	22.0	22.0	21.0	22.0	19.0
III	20.5	20.5	20.0	21.0	17.2
IV	21.5	21.7	19.8	21.5	20.0
Tentacle length	25.0	31.0	30.0	34.0	26.0
Club length	12.0	15.2	14.5	15.0	14.0

of arms of the female are equipped with small, weakly developed hooks on the sucker ring (Fig. 2d). There are no hooks present in the males.

The *tentacles* are only slightly longer than the arms. The clubs (Fig. 1e) are about one-half the tentacle length, bordered on either side by a protective membrane and with a well-developed dorsal swimming keel distally. The club possesses numerous minute suckers whose chitinous rings bear three or four rectangular teeth distally and a small broad tooth proximally (Fig. 2c). There are no hooks present. The fixing apparatus consists of a series of alternating small suckers and whitish pads which extend along the dorsal margin of the club from the carpal region to about the middle of the hand.

The *buccal membrane* has seven lappets and supports.

The *radula* (Fig. 2f) possesses seven teeth in each transverse row: a tricuspid rhachidian, a bicuspid admedian, and two lateral unicuspid sabre-shaped teeth.

The *gladius* (Fig. 1f) is long and narrow, widest just posterior to the midpoint and tapering with straight sides to a small shallow cone. The maximum width is about one-eighth the length.

Measurements of selected specimens are listed in Table 1.

A spermatophore is shown in Fig. 2e.

Coloration: The general body color is whitish or silvery with scattered reddish-brown chromatophores densest on the dorsal midline of the mantle and the posterodorsal region of the head.

Type locality: Collected at 45°26.8'N, 125°08.1'W, near the surface by M. Laurs with a dipnet while nightlighting aboard the R/V *Acona*, at 0045 on 11 September 1960.

Discussion: It was originally thought that these specimens were juve-

TABLE 2.—Data on collections of *Gonatus anonychus* made by the Department of Oceanography, Oregon State University

DATE OF COLLECTION	LOCATION	DORSAL MANTLE LENGTH (MM)
1 July 1960	45°15.0' N, 126°29.0' W	62, 75, 78
10 July 1960	42°49.5' N, 125°55.5' W	69, 70, 70, 70, 71, 71, 72, 75
11 September 1960	45°26.8' N, 125°08.1' W	69.5 (Holotype)
12 September 1960	44°00.0' N, 125°15.7' W	72
1 August 1961	44°50.4' N, 125°09.7' W	72
15 August 1961	44°27.0' N, 125°15.6' W	68, 73, 73, 75, 75
23 August 1961	46°14.5' N, 127°06.0' W	70
9 January 1962	44°39.1' N, 127°27.0' W	70

niles of one of the known species of the Gonatidae. However, the presence of fully formed spermatophores lodged in the penis of male specimens and of well-developed nidamental glands in the females indicates that this is not the case. Although the family Gonatidae is in need of revision at the generic level, *G. anonychus* may be separated from the other species of the genus *Gonatus* by the following characters.

It may be distinguished from *G. fabricii* by the lack of tentacular club hooks, seven instead of five teeth in each transverse row of the radula, the reduced number of teeth on the sucker margins, and the absence of true hooks on the arms, particularly in the males. In general appearance it resembles *G. magister* but differs from that species by the presence of only three nuchal folds instead of four, the complete lack of hooks on the arms of mature males, and the presence of only a few small unsheathed hooks on the suckers of all but the ventral arms of the female, the smaller fins in *anonychus*, and only three or four teeth on the chitinous rings of the club suckers of *anonychus* compared with 20 teeth on the same rings in *magister*. The teeth on the suckers of both the tentacles and the arms of *G. magister* are shown by Berry (1912) and Sasaki (1929) to be acute, whereas those of *G. anonychus* are truncate.

Gonatus fabricii from our collection, while even smaller than *G. anonychus*, have well-developed tentacular hooks. One small specimen of *G. magister* has been examined (43.0 mm ML), and although its fins are smaller relative to the mantle length than those proportions given by Berry (1912), the hooks on the arms are numerous and large, and the teeth on the sucker margins agree with Berry's description.

Both *G. anonychus* and *G. fabricii* occur sympatrically off Oregon, occasionally both species appearing in collections from the same station. *G. magister* also occurs in the northeastern Pacific (Berry, 1912).

Although nightlight collections were made during every season of the year out to 165 miles offshore, most of the *G. anonychus* were collected

during late summer about 50 miles offshore in the vicinity of the 1000-fathom contour (Table 2). This may be due to the better sea conditions for nightlighting during this season or perhaps may reflect an inshore movement during the summer. The one specimen taken in January was captured the farthest distance from shore, about 145 miles.

The name *anonychus* is taken from the Greek *an* meaning "without" and *onychos* meaning "hooks" or "claws," and refers to the absence of hooks on the arms of the males and only degenerate ones in the females.

LITERATURE CITED

- Berry, S. Stillman. 1912. A review of the cephalopods of western North America. Bull. U. S. Bur. Fish., 30: 269-336, Pls. 32-54, text figs. 1-18.
- Sasaki, Madoka. 1929. A monograph of the dibranchiate cephalopods of the Japanese and adjacent waters. J. Coll. Agri. Hokkaido Imper. Univ., 20 (Suppl.): 1-357, 30 pls., 159 text figs.

